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- (88) Date of publication of the international search report:
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- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: GENES ASSOCIATED WITH OBESITY AND METHODS FOR USING THE SAME

(57) Abstract: The present invention describes the chromosomal location of obesity susceptibility genes and provides methods for detecting the presence of such genes. The present invention enables the development of novel therapies to treat obesity.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12Q1/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, EMBASE, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/29058 A (ALSOBROOK JOHN P II ; BURGESS CATHERINE E (US); MALYANKAR URIEL M (US)) 11 April 2002 (2002-04-11) claims 1-41; sequence 125	1-3,6,7, 12,13
X	CHAGNON Y C ET AL: "THE HUMAN OBESITY GENE MAP: THE 2002 UPDATE" OBESITY RESEARCH, BATON ROUGE, LA,, US, vol. 11, no. 3, 14 March 2003 (2003-03-14), pages 313-367, XP008026392 ISSN: 1071-7323 tables 1,3,5	14
X	US 2002/169287 A1 (MCMILLAN JANINE SUSAN ET AL) 14 November 2002 (2002-11-14) claim 41	21,22
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

10 December 2004

Date of mailing of the international search report

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/78894 A (GENOME THERAPEUTICS CORP) 25 October 2001 (2001-10-25) claims 53-61,63-72	21,22
A	JETTEN A M ET AL: "THE ROR NUCLEAR ORPHAN RECEPTOR SUBFAMILY: CRITICAL REGULATORS OF MULTIPLE BIOLOGICAL PROCESSES" PROGRESS IN NUCLEIC ACID RESEARCH AND MOLECULAR BIOLOGY, ACADEMIC PRESS, US, vol. 69, 2001, pages 205-247, XP001068423 ISSN: 0079-6603 page 208 - page 209 page 226	1
A	BRUFORD E A ET AL: "Linkage Mapping in 29 Bardet-Biedl Syndrome Families Confirms Loci in Chromosomal Regions 11q13, 15q22.3-q23, and 16q21" GENOMICS, ACADEMIC PRESS, SAN DIEGO, US, vol. 41, no. 1, 1 April 1997 (1997-04-01), pages 93-99, XP004459343 ISSN: 0888-7543 the whole document	1
A	ACKERMAN S L ET AL: "Cloning and Mapping of theUNC5CGene to Human Chromosome 4q21-q23" GENOMICS, ACADEMIC PRESS, SAN DIEGO, US, vol. 52, no. 2, 1 September 1998 (1998-09-01), pages 205-208, XP004449055 ISSN: 0888-7543 the whole document	1
X	SUNDVOLD H ET AL: "Identification of a novel peroxisome proliferator-activated receptor (PPAR) gamma promoter in man and transactivation by the nuclear receptor RORalpha1." BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS. 21 SEP 2001, vol. 287, no. 2, 21 September 2001 (2001-09-21), pages 383-390, XP002309631 ISSN: 0006-291X page 383 - page 384, left-hand column	16,17, 19,21-23
X	WO 99/50660 A (RASPE ERIC ; BONHOMME YVES (FR); MERCK PATENT GMBH (US)) 7 October 1999 (1999-10-07) page 5, line 1 - line 20; claims 1-17; figures 1-17	16,17, 19,21-23

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/094990 A (BANDMAN OLGA; INCYTE GENOMICS INC ; KALLICK DEBORAH A (US); XU YUMING) 28 November 2002 (2002-11-28) REMAP25 encoded by Seq ID NO: 51 100% identity in 837 nt overlap with SEQ ID NO:7 SEQ ID NO: 25: 99.7% identity in 336 aa overlap with SEQ ID NO:8 pages 21,22; claim 106	1-3,5-7, 10-13
X	WO 93/06215 A (SALK INST FOR BIOLOGICAL STUDI) 1 April 1993 (1993-04-01) SEQ ID NO:1 99.8% identity SEQ ID NO:7 in 1570 ntclaims 2,9	1-3,5-7, 10-13
A	GIGUERE V ET AL: "The orphan nuclear receptor ROR-alpha (RORA) maps to a conserved region of homology on human chromosome 15q21-q22 and mouse chromosome 9" GENOMICS, vol. 28, no. 3, 1995, pages 596-598, XP002309632 ISSN: 0888-7543 figures 1,2	14,15

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Int ional application No.

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Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:
 - a. type of material
 - ☒ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material
 - ☒ in written format
 - ☒ in computer readable form
 - c. time of filing/furnishing
 - ☒ contained in the international application as filed
 - ☒ filed together with the international application in computer readable form
 - ☐ furnished subsequently to this Authority for the purpose of search
2. ☒ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
3. Additional comments:

INTERNATIONAL SEARCH REPORT

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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 18
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy
2. ☒ Claims Nos.: 19, 20
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
1-23, 26, 27
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 18

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy

Continuation of Box II.2

Claims Nos.: 19,20

Present claims 19, 20 relate to a composition defined by reference to a desirable characteristic or property, namely modulating the expression or activity of an obesity protein. The claims cover all compositions having this characteristic or property, whereas the application provides no support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for such compositions. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Independent of the above reasoning, the claims also lack clarity (Article 6 PCT). An attempt is made to define the composition by reference to a result to be achieved. Again, this lack of clarity in the present case is such as to render a meaningful search over the whole of the claimed scope impossible. Consequently, no search has been carried out for claim 20

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

International Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0229058	A	11-04-2002	AU 9664901 A	22-04-2002
			CA 2424199 A1	11-04-2002
			EP 1349930 A2	08-10-2003
			JP 2004531203 T	14-10-2004
			WO 0229058 A2	11-04-2002
			US 2004048245 A1	11-03-2004
			US 2004068095 A1	08-04-2004
US 2002169287	A1	14-11-2002	AU 5512900 A	22-01-2001
			CA 2377784 A1	11-01-2001
			EP 1196562 A1	17-04-2002
			JP 2003504019 T	04-02-2003
			MX PA01013425 A	04-09-2003
			WO 0102560 A1	11-01-2001
WO 0178894	A	25-10-2001	US 6683165 B1	27-01-2004
			AU 5351201 A	30-10-2001
			CA 2405078 A1	25-10-2001
			EP 1317532 A2	11-06-2003
			WO 0178894 A2	25-10-2001
			US 2004023215 A1	05-02-2004
			US 2004002470 A1	01-01-2004
			US 2004077011 A1	22-04-2004
			US 2003138925 A1	24-07-2003
WO 9950660	A	07-10-1999	FR 2776388 A1	24-09-1999
			AU 752062 B2	05-09-2002
			AU 3521599 A	18-10-1999
			CA 2326141 A1	07-10-1999
			WO 9950660 A1	07-10-1999
			EP 1070253 A1	24-01-2001
			JP 2004500539 T	08-01-2004
			NZ 507761 A	25-10-2002
WO 02094990	A	28-11-2002	CA 2447338 A1	28-11-2002
			WO 02094990 A2	28-11-2002
			EP 1456655 A2	15-09-2004
			WO 03048305 A2	12-06-2003
WO 9306215	A	01-04-1993	AT 215601 T	15-04-2002
			AU 2579692 A	27-04-1993
			CA 2115452 A1	01-04-1993
			DE 69232537 D1	08-05-2002
			DE 69232537 T2	24-10-2002
			EP 0609240 A1	10-08-1994
			JP 2002514881 T	21-05-2002
			WO 9306215 A1	01-04-1993
			US 5571696 A	05-11-1996
			US 5696233 A	09-12-1997
			US 5710004 A	20-01-1998